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(88) Date of publication of the international search report:  
29 December 2004

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: METHODS AND COMPOSITIONS FOR PRODUCING MALE STERILE PLANTS

(57) Abstract: The invention relates to methods of producing male sterile plants by increasing the level of activity of the hydroxy-  
jasmonate sulfotransferase by genetic modification of such plant. Furthermore, the present invention provides methods to restore the  
fertility of the male sterile phenotype observed in such genetically modified plants by the application of a composition containing at  
least one jasmonate and an acceptable carrier onto the male sterile flowers.



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A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 C12N15/82 A01H5/00 A01H1/02 A01N37/06

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS, EMBASE

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97/10703 A (UNIV WASHINGTON) 27 March 1997 (1997-03-27)  page 4, line 28 - page 5, line 6 page 7, line 3 - line 10 page 8, line 22 - page 10, line 2 -----	1,2, 4-12,14, 20,21
X	WO 01/02589 A (VARIN LUC ; GIDDA SATINDER (CA)) 11 January 2001 (2001-01-11) page 21, line 31 - page 22, line 28; example 2 page 25, paragraph 2 - paragraph 3; table 1 ----- -/-	7-11,14

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

6 August 2004

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PARK JOON-HYUN ET AL: "A knock-out mutation in allene oxide synthase results in male sterility and defective wound signal transduction in Arabidopsis due to a block in jasmonic acid biosynthesis" PLANT JOURNAL, vol. 31, no. 1, July 2002 (2002-07), pages 1-12, XP002291453 ISSN: 0960-7412 page 3, column 2, paragraph 2 - page 4, column 2, paragraph 4 page 7, column 1, line 4 - line 6 -----	1
A	ZHAO DAZHONG ET AL: "Male fertility: A case of enzyme identity" CURRENT BIOLOGY, vol. 10, no. 24, 2000, pages R904-R907, XP002291454 ISSN: 0960-9822 the whole document -----	1,2, 4-12,14, 20,21
P,A	GIDDA SATINDER KAUR ET AL: "Biochemical and molecular characterization of a hydroxyjasmonate sulfotransferase from Arabidopsis thaliana." JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 278, no. 20, 16 May 2003 (2003-05-16), pages 17895-17900, XP002291455 ISSN: 0021-9258 the whole document -----	1,2, 4-12,14, 20,21

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9710703	A	27-03-1997	AU	706527 B2	17-06-1999
			AU	7367096 A	09-04-1997
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			CA	2232623 A1	27-03-1997
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			WO	9710703 A1	27-03-1997
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			WO	0102589 A2	11-01-2001
			CA	2377899 A1	11-01-2001
			EP	1196615 A2	17-04-2002
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**Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1,4,5,20,21, (partially); 2,6-12,14 (completely)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1,4,5,20,21 (partially); 2,6-12,14 (completely)

Methods for producing a male sterile plant involving increasing the endogenous activity of a plant hydroxyjasmonate sulfotransferase; plant transformation vectors comprising i.a. a nucleic acid having at least 50% homology to SEQ ID NO:1 or 2 or encoding an amino acid having at least 50% homology to SEQ ID NO:3 or 4; a genetically modified plant with elevated hydroxyjasmonate sulfotransferase levels.

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2. claims: 1,4,5,20,21 (partially); 3,13 (completely)

Methods for producing a male sterile plant involving decreasing the synthesis of a jasmonic acid 11-/12-hydroxylase and a genetically modified plant with decreased 11- or 12-hydroxyjasmonate levels.

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3. claims: 15-19 (completely); 20,21 (partially)

Compositions comprising i.a. jasmonate and methods for using the same.

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Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FI	Finland	ML	Mali
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